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Substation Monitoring and Control Based on Microcontroller Using IoT

Mayuri Patil[1], Snehal Desai[2], Shubham Pawar[3], Swapnil Shewale[4], Prof. P. J. Yadav[5]

[1,2,3,4] Student, Department of Electrical Engineering, Shree Santkrupa Institute of Engineering and Technology, Ghogaon, Karad, India.
[5]Professor, Department of Electrical Engineering, Shree Santkrupa Institute of Engineering and Technology, Ghogaon, Karad, India.

Abstract - *Automation of substations has become a need of every utility to increase and improve its efficiency improve the quality of the energy supplied. Health care surgeries are the most important. In general, IoT has been used significantly to connect advanced medical devices and to make smart effective healthcare for people. Sensors include a current sensor, an AC voltage sensor and a temperature sensor. Each sensor is equipped with an Arduino microcontroller. The Arduino Uno is working as a microcontroller in the coordinated intelligent voltage and current monitoring system (SVCMS) to determine the voltage and current sensor results. It also passes this data on after wards review, to the end PC gimmick exercising the IoT module. The Arduino Uno controller and IoT the modules are individually a microcontroller and far from distorted. The Arduino controller and IoT modules are microcontroller and remote control included.*

Key Words: ADC, LCD, Arduino, Relay, Buzzer, etc…

1. INTRODUCTION

Enhance the IoT-based continuous inspection system for substation testing and management by increasing test frequencies. Administrators can use this integrated method to check the general condition in steady and transient conditions of the substation. The power structures are clearly strange, incredibly huge and dynamic organizations. These electric scaffolds come together for practical benefits, improved quality and functional benefits. New devices must meet the high-tech needs of the substation, while being safe, adaptable, design-ready and easily drinkable for the changes to come. The substation device must minimize unplanned downtime and also increase system consistency.

1.1 LITERATURE REVIEW

This project aims to design a system capable of wirelessly covering and controlling the technology of the substation called IOT. An IOT module provides the communication interface. By using the IOT module, we can update the data on Web boy. In our design, we take into account the parameters of the substation, the voltage and frequency of the current, the temperature. Krupal Dhimar, Mr. Jenish Patel, Mr. Yasin Shaikh, Mr. Ana Musani "Monitoring and control of cabins via microcontroller and GSM" by Krisn Patel Objective: The project consists in the acquisition and recording of external electrical parameters such as voltage, current and frequency values in real time via gsm network with gsm modem / telephone together with the temperature in the control unit stoner can launch commands in the form of text messages to read the electrical parameters remotely. This system can also automatically record electrical parameters in real time periodically (ground in time settings) in the form of SMS. This system can be designed to send SMS alerts when the relay trips or when the voltage or current exceeds predefined limits. This design uses a microcontroller. The controller can communicate effectively with the various detectors used. The controller is equipped with an internal memory in compliance with the law. This memory is used to leave a set of assembly instructions in the controller. And the function of the regulator depends on its assembly instructions. The controller is programmed with the "bedded c" programming language. As a result, the substation bias voltage parameters, similar to frequency, voltage, load impedance, tilt, oil, paint position, temperature, cooling condition, power supply and safety system are displayed correctly.

1.2 HARDWARE COMPONENTS

- Arduino Nano
- Current transformer
- Potentiometer
- LM35 Temperature sensor

- 555 timer
- Regulated Power Supply (RPS)
- Transform
- Rectifier
- Filter
- Regulator
- Wi-Fi module
- Liquid Crystal Display (LCD)

1.3 SOFTWARE REQUIREMENTS

- Embedded C
- Arduino software (IDE) ADVANTA

2. METHODOLOGY

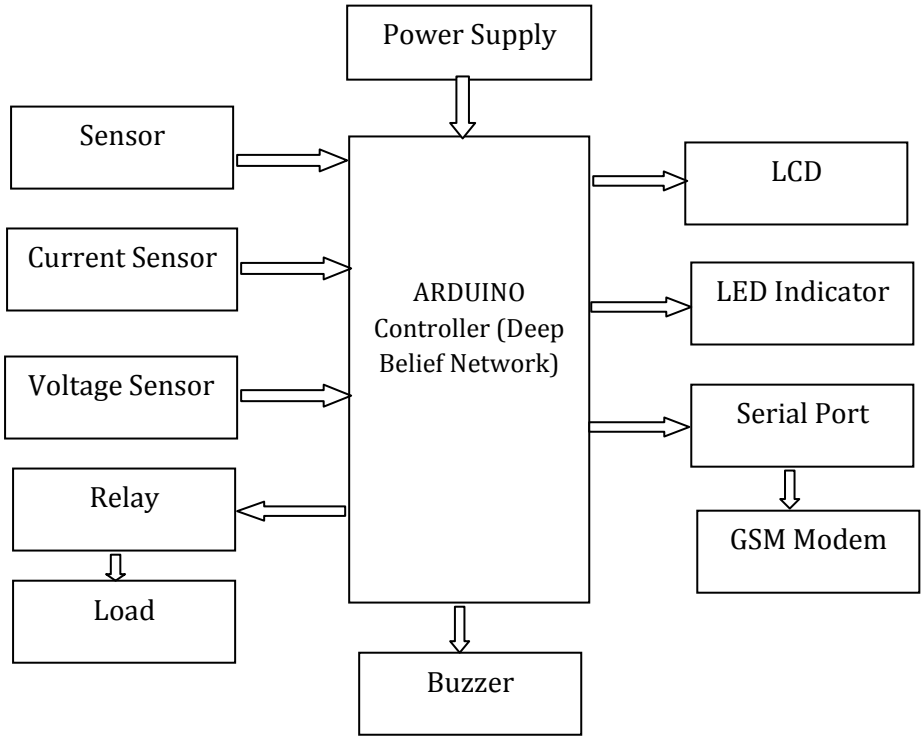

Fig -1: Block diagram of Substation Monitoring and Control Based on Microcontroller Using IoT

PREVENT DIAGRAM DESCRIPTION

1. Arduino circuit
2. Power supply
3. 16 x 2 LCD display
4. GSM modem
5. Relay driver

Arduino Circuit:

Arduino will give signal to the relay to cut off the particular area electricity where fault has been occurred. For open circuit, if current is less than the minimum value current, then the relay of that particular area will be off. For very high voltage, if voltage is greater than the cut off voltage, then the relay of that particular area will be off Buzzer and indicator of the panel will become ON to alarm the people in the Substation. Although Arduino will automatically cut off the power supply of the particular area. Then, also a cut OFF and ON which has been provided in the panel to manually cut OFF and ON the particular area Distribution line.

Power supply:

The project required +5 volt and +12 volt power supplies. +5 volts is given to the microcontroller board and LCD display. +12 Volts are used for Relay and All Other Driver.

16 X 2 LCD display:

It consists a user program area of RAM that can be programmed to generate any character that can be showed using a dot matrix. To controlling, the hexadecimal command byte 80H is used to indicate that the display RAM address 00H is selected. The display takes high time to performing its function. LCD bit 7 is monitored at logic high. Hence the display is not overwritten.

GSM modem:

The wireless modem works like a dial-up modem. The difference between is that dial-up modems send and receive data over fixed telephone lines, and wireless modems send and receive data over radio waves. In GSM mobile phones, a SIM card from the mobile phone provider is required for operating the GSM modem. The GSM modem is an external unit or a PCMCIA card (known as a PC card). External GSM modems connect to your PC via a serial cable, USB cable, Bluetooth, or infrared.

Relay driver:

We are using node MCU ESP8266 to control the relay and therefore electricity to Distribution area Through internet. The microcontroller output is not enough to drive the relay directly. Hence to drive a relay, use a relay driver uses a transistor as a switch.

3. CIRCUIT DIAGRAM

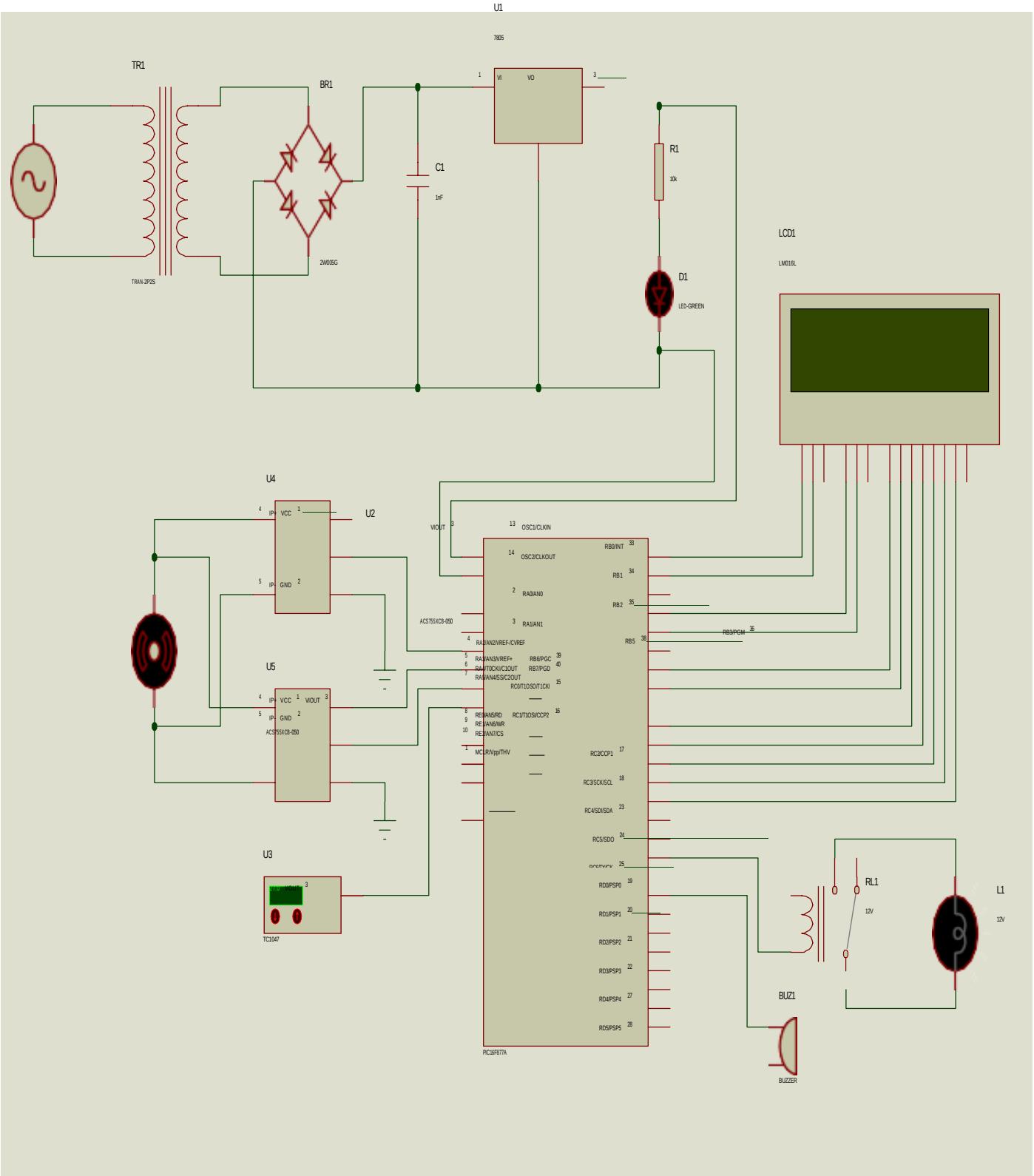

Fig -2: Circuit diagram of Substation Monitoring and Control Based on Microcontroller Using IoT

4. CONCLUSION

Completion of our project "Monitoring and control of substations with microcontroller and IOT", we can improve quality of transmitted power and sustained power transmission. The substation can talk the aid association shows which failures are linked and strengthens the two-way economy. A control of the colored boundaries is carried out to ensure the safety and handling of the station. With largely motivated help to produce growth, the effort was successfully implemented. In this way, the business was effectively set up and tested. The designed system provides Remote control of substations. The specific area of the substation can be controlled in the same way Transmission of field directions from the substation.

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